

Remarks

Claims 1-58 are pending in the application. All claims stand rejected.

Claim Rejections

Claims 1-58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,671,267 to August ("August") in view of U.S. Patent No. 6,931,123 to Hughes ("Hughes").

As amended, claim 1 recites a camera coupled to the processor and the interface to convey video to the far-end user. Support for this limitation is found on page 10, lines 8-12 of the specification. The camera enables the "videoconferencing" recited in the preamble.

August, however, does not teach or suggest videoconferencing or a camera to enable videoconferencing. August only discloses a cordless telephone to enable telecommunication. Hughes also does not disclose or suggest videoconferencing or a camera.

Claim 1 further recites:

- a noise cancellation module coupled to the wireless receiver and to the interface and having:
 - a first input to receive TV audio output including TV audio and far-end user speech;
 - a second input coupled to the receiver to receive input sound;
 - and
 - an adaptive filter to remove the TV audio output from the input sound based on an estimate of received TV audio output.

The Office Action apparently concedes that August does not satisfy these limitations, relying instead on column 2, lines 2-10 and Figure 3 of Hughes. Hughes generally discloses echo cancellation to remove echoes from a far-end speaker 31.

Claim 1 recites an adaptive filter to remove TV audio output including TV audio and far-end user speech. The claimed second input receives input sound which will include near-end user speech, far-end user speech and TV audio.

Unlike the claimed invention, Hughes only discloses the cancellation of far-end user speech and does not disclose cancellation of TV audio. Hughes does not teach or suggest cancellation of audio originating from both a far-end user and a TV broadcast. Hughes does not consider filtering a signal with an origin other than near-end and far-end speech.

"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP § 2143.03. Because August and Hughes do not teach the limitation of canceling far-end speech and TV audio, claim 1 represents patentable subject matter.

Independent claims 15, 41, 51, 53, 55, and 57 include similar limitations to those discussed above and likewise represent patentable subject matter.

As amended, claim 8 recites:

an output suppression module coupled to the wireless receiver and to a TV audio output, the output suppression module having:
a first input coupled to the receiver to receive input sound;
a first output coupled to the TV audio output; and
a near-end audio detector to detect near-end audio in the input sound and to suppress the TV audio output when the near-end audio is detected while passing far-end user speech.

The Office Action cites to column 11, lines 3-18 of August, which states:

Thus, in operation, when the set-top box 32 receives a ringing signal from the tip-ring line 34, the set-top box 32 sends the ringing signal to the handset unit 10 in a conventional manner via a radio frequency (RF) link. The user of the handset unit 10 then presses the phone button on the handset unit 10 to answer the call. The handset unit, in turn, sends via an infrared link the audio mute (or volume reduction) signal back to the set-top box for adjusting the

volume as desired by the user. The infrared link between the handset unit 10 and the set-top box 32 may be between the infrared transmitter 125 on the handset unit and an infrared detector 33 on the set-top box 32. Once muted or reduced in volume level, the remotely operated device remains in this state as long as the telephone is off-hook or until the user takes some action to manually restore the audio signal to its normal volume level.

August teaches that the user of the handset unit 10 presses a button to answer a call and the handset unit, in turn, sends an audio mute signal. Manually answering a phone and automatically triggering a mute is not a near-end audio detector to detect near-end audio in the input sound and to suppress the TV audio output when the near-end audio is detected. August has no detection of near-end audio. August does not teach suppressing the TV audio when the near-end audio is detected. August merely mutes the sound when a call is answered. Manually answering a telephone call is not detecting near-end audio. In August, a user may answer a call and initially listen rather than speak and still the TV audio is muted. Accordingly, August operates to mute a television upon call answering, not upon detection of near-end audio.

In August, the sound continues to be muted as long as the telephone is off-hook or until the user takes manual action. Restoration of TV audio is clearly based on manual operation rather than a detection of near-end audio. The claimed limitation is not met by the teachings of August.

The Office Action further cites to column 1 lines 56-65 of Hughes, which states:

A simple form of echo control, called echo suppression, is illustrated in FIG. 2. Echoes are prevented by only allowing signal transmission if the person in the room is speaking. Switches 51, 52, or variable attenuators in more sophisticated systems, are controlled by analysing the send and receive signals 41, 42 and using a decision algorithm to determine when transmission

is permitted. This is a very effective echo control method, but can be very intrusive. Double talk, i.e. both parties talking at the same time, is not possible.

As stated in Hughes, this effective echo control method is intrusive, and double talk is not possible. In the claimed invention, double talk is possible because only TV audio is suppressed and the far-end user speech is passed. As Hughes points out, double talk is desired as it is more natural and less intrusive. Thus, the embodiment of Figure 2 of Hughes is undesirable. The claimed invention is able to pass far-end user speech and suppress TV audio as these two audio signals have different sources of origin. Accordingly, a double talk situation exists. Hughes does not teach or suggest suppression of a TV signal while passing a far end voice signal. This follows as Hughes does not consider multiple signals of different origins. Because all claimed limitations are not taught or suggested by August or Hughes, individually or in combination, claim 8 represents patentable subject matter.

Independent claims 28, 47, 52, 54, 56, and 58 include limitations similar to claim 8 and likewise represent patentable subject matter.

Claim 7 represents patentable subject matter for the reasons discussed above. Furthermore, claim 7 includes the limitation of a training module coupled to the noise cancellation module and to the wireless receiver for training the adaptive filter to improve the estimate of received TV audio output. The Office Action states that this limitation is met "by the $h(t)$ adaptive function for driving $e(t)$ towards zero and adapting to the input signal using algorithms, such as LMS, RLS, or AP" of Hughes. However, Hughes teaches that this function is performed by the canceller 62. See column 2, lines 2-14. The canceller 62 is already cited for meeting the limitation of the noise cancellation module. The claimed training module is an

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additional element that is coupled to the noise cancellation module to train the adaptive filter. The adaptive features of a canceller 62 do not meet the claimed limitations of a noise cancellation module adaptive filter and a training module coupled to the noise cancellation module.

The specification recites that "[t]he purpose of the training module 1104 is to provide a better estimate to the adaptive filter 1102 than simply the television audio output 1004." Page 39, lines 17, 22. Thus, the training module provides additional resources for the adaptive filter than television audio. In one embodiment, the training module generates its own sound to train the adaptive filter. Page 41, lines 3-12. This training described in the specification is more than the adaptive filtering performed by the canceler 62 of Hughes.

"Training" is normally defined as "preparing in order to become more proficient." www.dictionary.com. This preliminary training is not performed by an adaptive filter which adapts on-line as it performs.

Claims 14, 21, and 34 likewise recite a training module, and are likewise believed to be patentably distinct over the prior art.

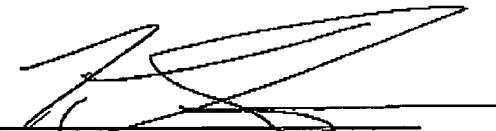
The remaining claims depend from their respective independent claim and represent patentable subject matter for the reasons discussed above.

Based on the foregoing, the Applicants respectfully submit that claims 1-58 are in condition for allowance. Reconsideration and early allowance of all pending claims herein is respectfully requested.

Respectfully submitted,

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